

# **Homestake Mining Company Uranium Mill Superfund Site**

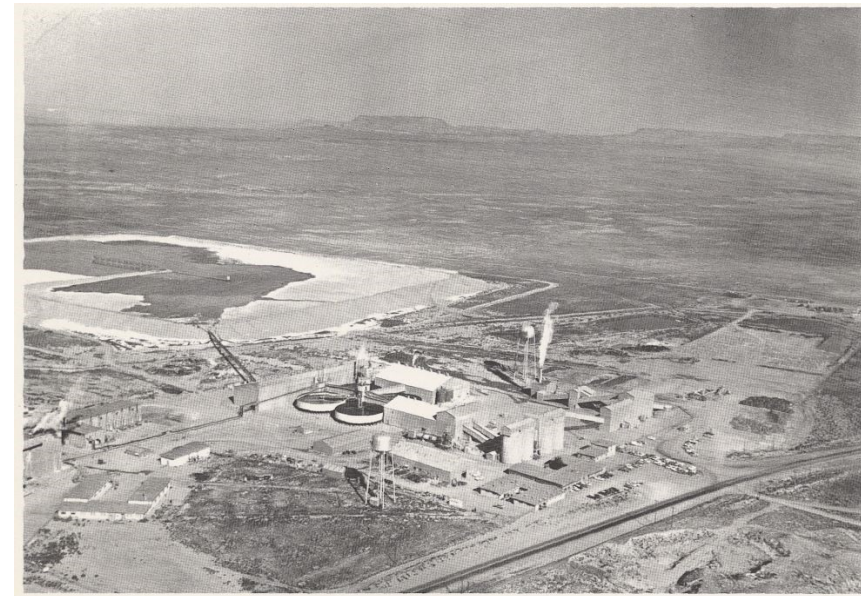
**Grants, Cibola County, New Mexico**

Update for Congressional Staff  
Senators Heinrich and Udall

Sai Appaji And Mark Purcell  
U.S. EPA Region 6  
Dallas, Texas  
May 23, 2018

# PRESENTATION OUTLINE

- Regulatory Authorities Roles and Responsibilities
- Superfund Program Overview
- Site Description
- Key Issues of BVDA
- Upgradient Ground Water Impacts
- USGS Background Study
- Next Steps
- Path Forward Schedule



Historic Site Photo

# Federal Regulatory Responsibilities

## NRC - EPA - DOE

- Nuclear Regulatory Commission [NRC]
  - Regulatory agency for closure of inactive uranium mill sites
    - 1978 Uranium Mill Tailing Radiation Control Act [UMTRCA]
    - National closure standards
    - Ground water standards (or background or Alternate Concentration Limits [ACLs])
- EPA
  - Remedial agency (1980 Superfund Law)
  - Selects site-specific remedies
    - Technical evaluation of contamination, risk, and cleanup options
    - Record of Decision [ROD]
    - Ground water standards (or background or ACLs)
- Department of Energy [DOE]
  - Long-term custodian of UMTRCA sites
    - After closure and EPA ROD satisfied

# State of New Mexico

## Regulatory Responsibilities



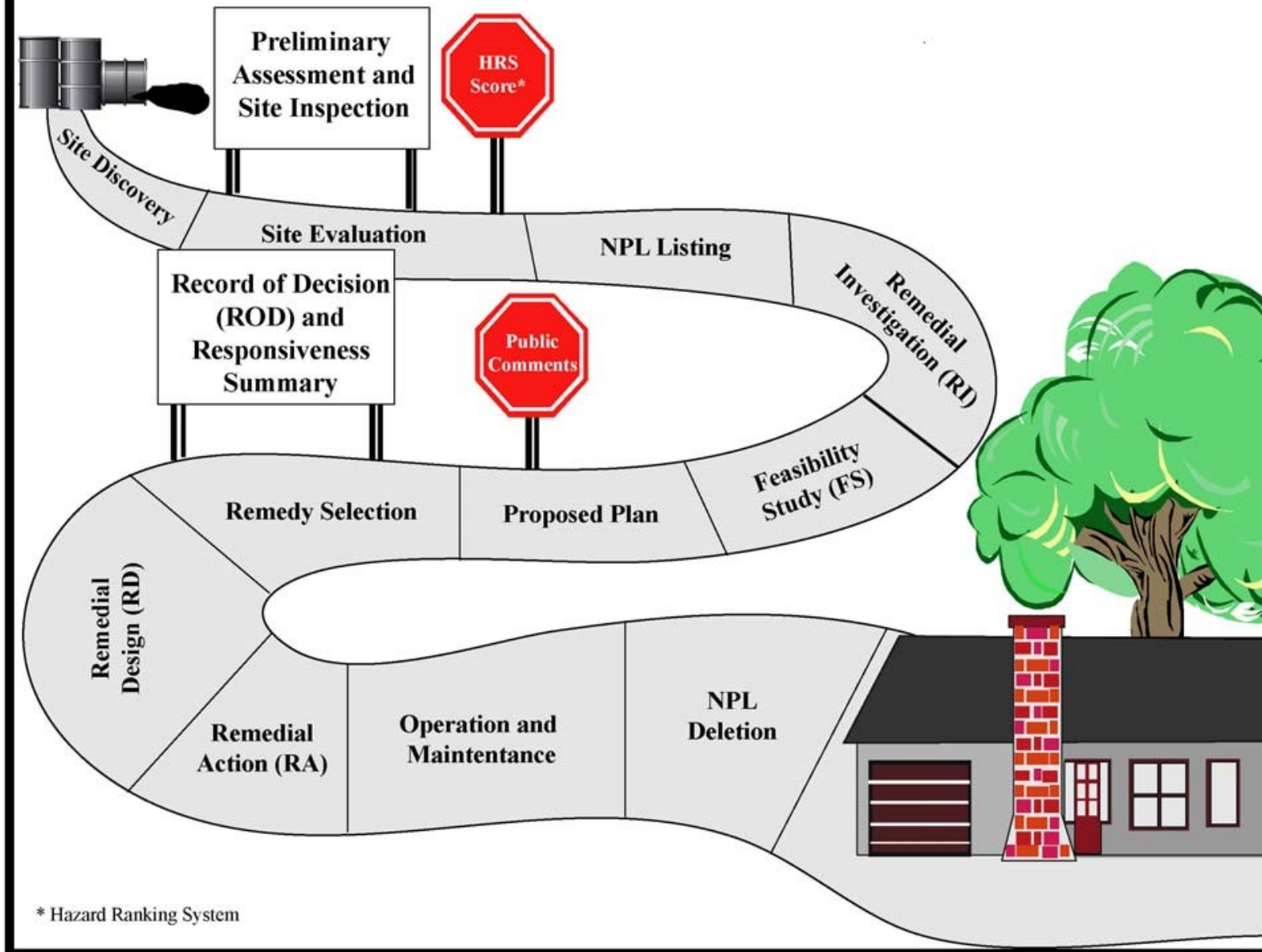
- NM Environment Department (NMED)
  - Regulates ground water pursuant to NM Water Quality Act
  - Ground water discharge permitting program
    - Ground Water Standards (or Background or ACLs)
- Office of State Engineer (OSE)
  - Regulates well permitting, construction, and abandonment

# SUPERFUND PROGRAM OVERVIEW



- CERCLA – Comprehensive Environmental Response, Compensation and Liability Act
  - Known as Superfund Law
  - Authorizes funds for cleanup of most polluted sites (National Priorities List or NPL)
- Objective – Reduce or eliminate threats to human health and environment
- Respond to releases or threatened releases of hazardous substances
  - Emergency or Remedial Response

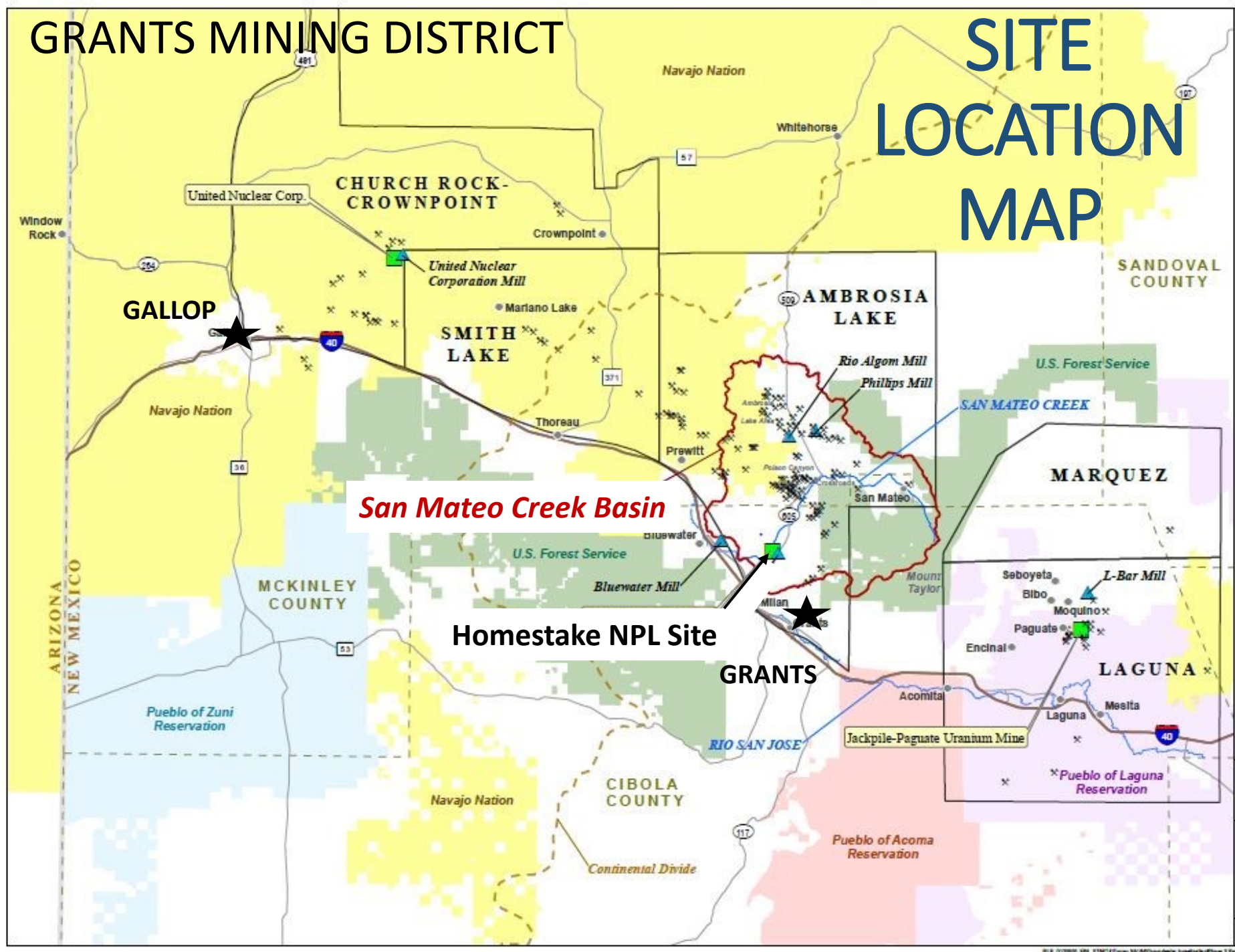
# The Superfund Process





# GRANTS MINING DISTRICT

# SITE LOCATION MAP

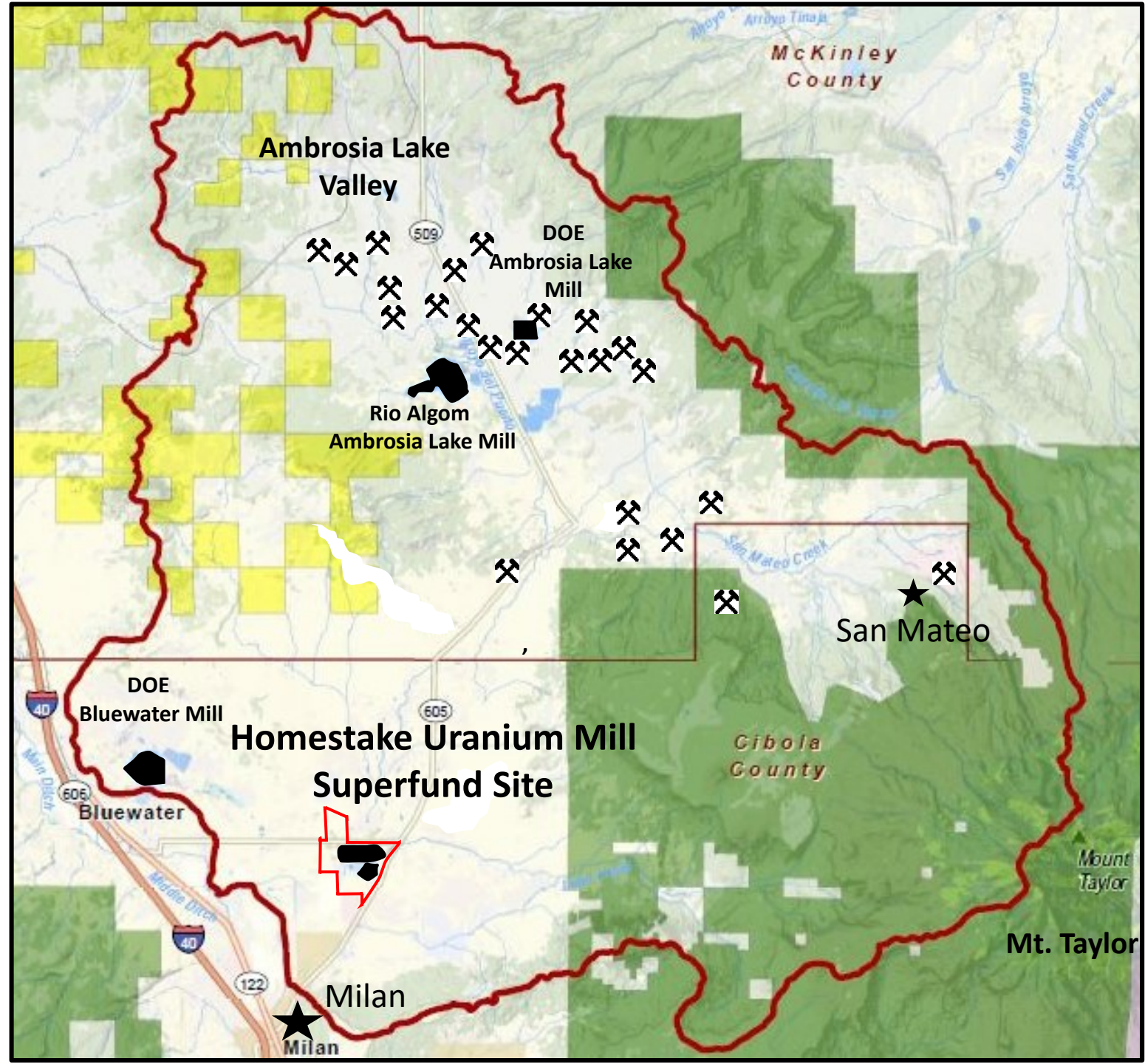


# Site Location Within San Mateo Creek Basin

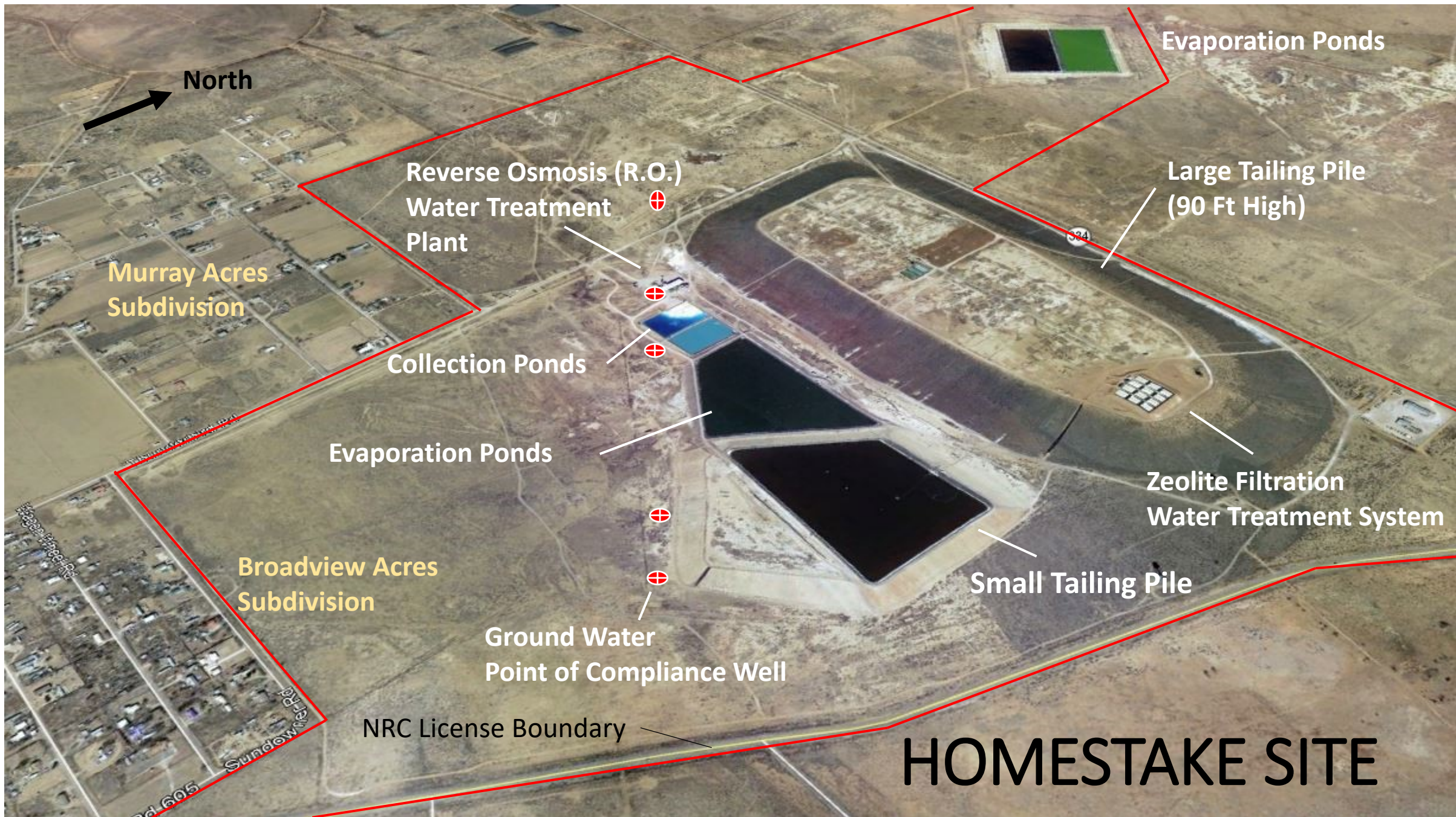
## Area of Extensive Uranium Mining

85 Legacy Mines  
4 Uranium Mills

 Wet Mine







North

Evaporation Ponds

Reverse Osmosis (R.O.)  
Water Treatment  
Plant

Large Tailing Pile  
(90 Ft High)

Murray Acres  
Subdivision

Collection Ponds

Evaporation Ponds

Zeolite Filtration  
Water Treatment System

Broadview Acres  
Subdivision

Small Tailing Pile

Ground Water  
Point of Compliance Well

NRC License Boundary

HOMESTAKE SITE

# GROUND WATER IMPACT

- Tailing fluids seeped from unlined tailing impoundments
  - Contamination discovered in 1960
  - Radionuclides and heavy metals
- Private water wells contaminated off site
- Placed on NPL in 1983
- Hook-ups to municipal water supply provided by Homestake in 1985
  - Settlement Agreement with EPA
  - Included 10 years of paying water usage
  - Large reduction in risk
- Ground water cleanup ongoing for 42 years
  - Initially under State authority in 1976
  - Subsequently under U.S. NRC authority in 1986 – Radiological Source Materials License
  - EPA/NRC signs Memorandum of Understanding - 1993



# KEY ISSUES RAISED BY BLUEWATER VALLEY DOWNSTREAM ALLIANCE (BVDA)

- Opposes ground water cleanup levels
  - Established by NRC in 2006
  - Uranium and selenium levels based on background
  - Five times higher than federal drinking water standards
- Suggests cleanup levels based on flawed background study by Homestake
- Wants cleanup levels changed to standards

# SITE GROUND WATER CONDITIONS VERY COMPLEX

- Upgradient impacts from legacy mining industry may be factor
  - Tens of billions of gallons of contaminated mine water discharged to basin (1950s – 1980s)
- Currently being investigated by EPA and New Mexico
  - San Mateo Creek Basin Ground Water Investigation





## Late 1950s – Early 1980s

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## Legend

## 12.5 Billion Gallons Discharged

 **Wet Mine Shafts**



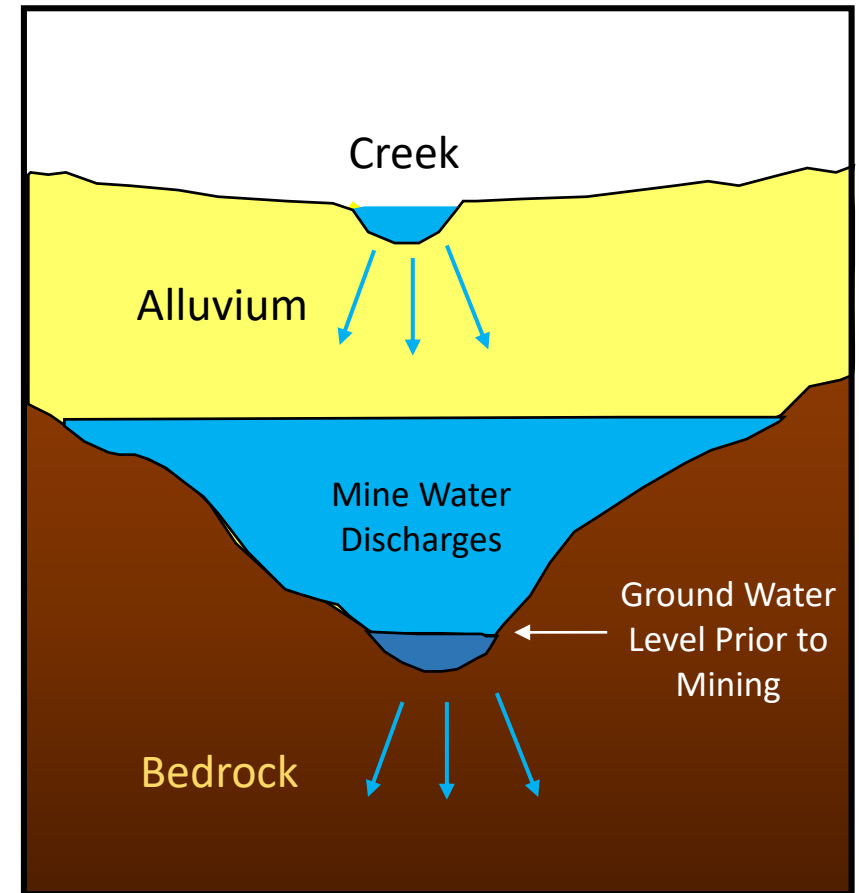
**Ore Body**

Draft – For Discussion Purposes Only



# HOW DID MINE DEWATERING OPERATIONS AFFECT GROUND WATER?

- ***Discharged billions of gallons*** of mine water to creeks and arroyos
- ***Water infiltrated*** into ground
- ***Increased amount of ground water*** in alluvial sediments and bedrock
- ***Changed quality*** of ground water



Draft – For Discussion Purposes Only  
Not to Scale



**ALLUVIAL SATURATION MAP 1977**

**Mine Water**

**DOE Bluewater**

**Homestake**

**Milan**

**San Mateo**

**Legend:**

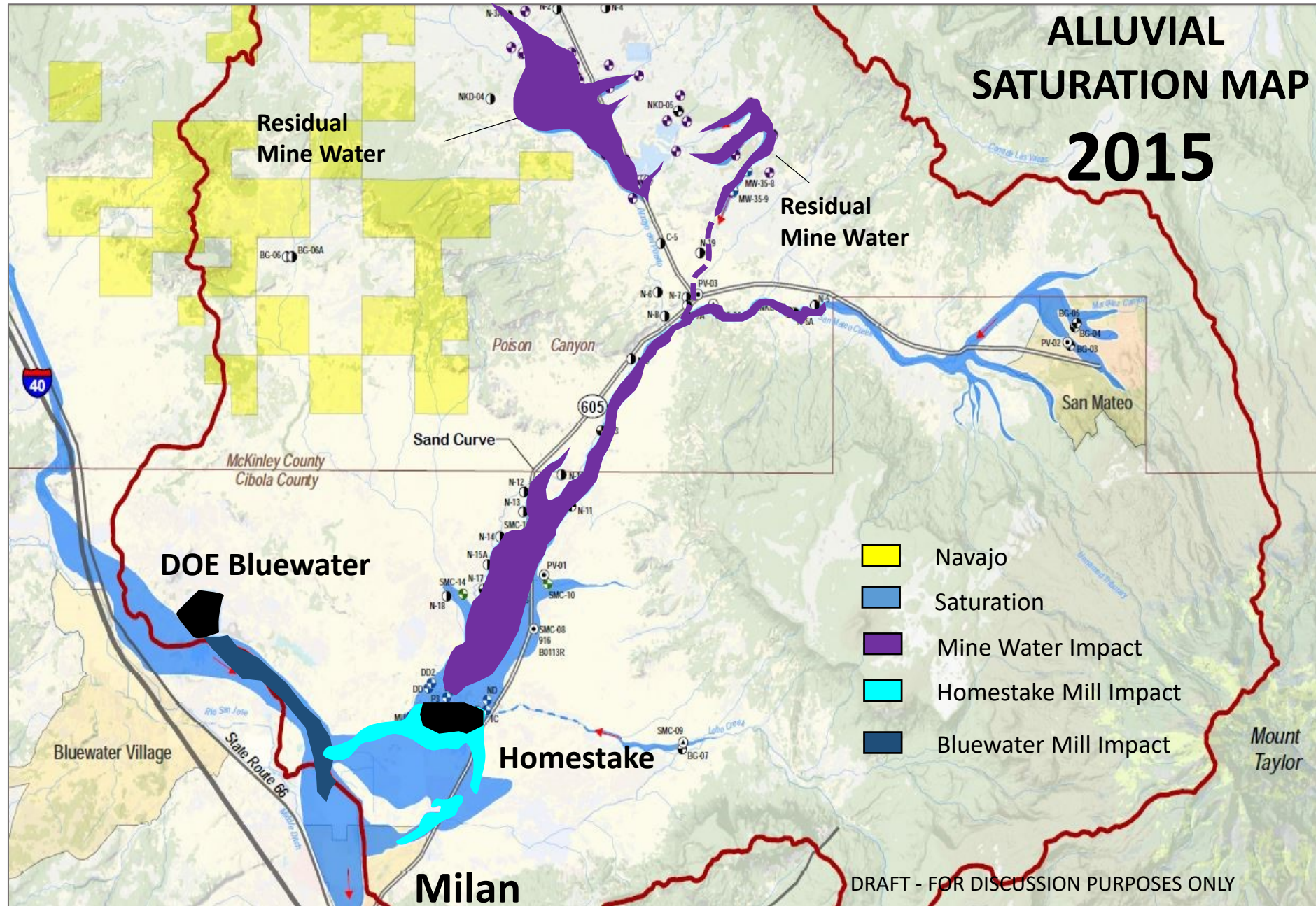
- Navajo
- Saturation
- Mine Water Impact
- Homestake Mill Impact
- Bluewater Mill Impact

**Other Labels:** Poison Canyon, Sand Curve, Bluewater Village, State Route 66, Interstate 40, McKinley County, Cibola County, Mount Taylor, DRAFT - FOR DISCUSSION PURPOSES ONLY

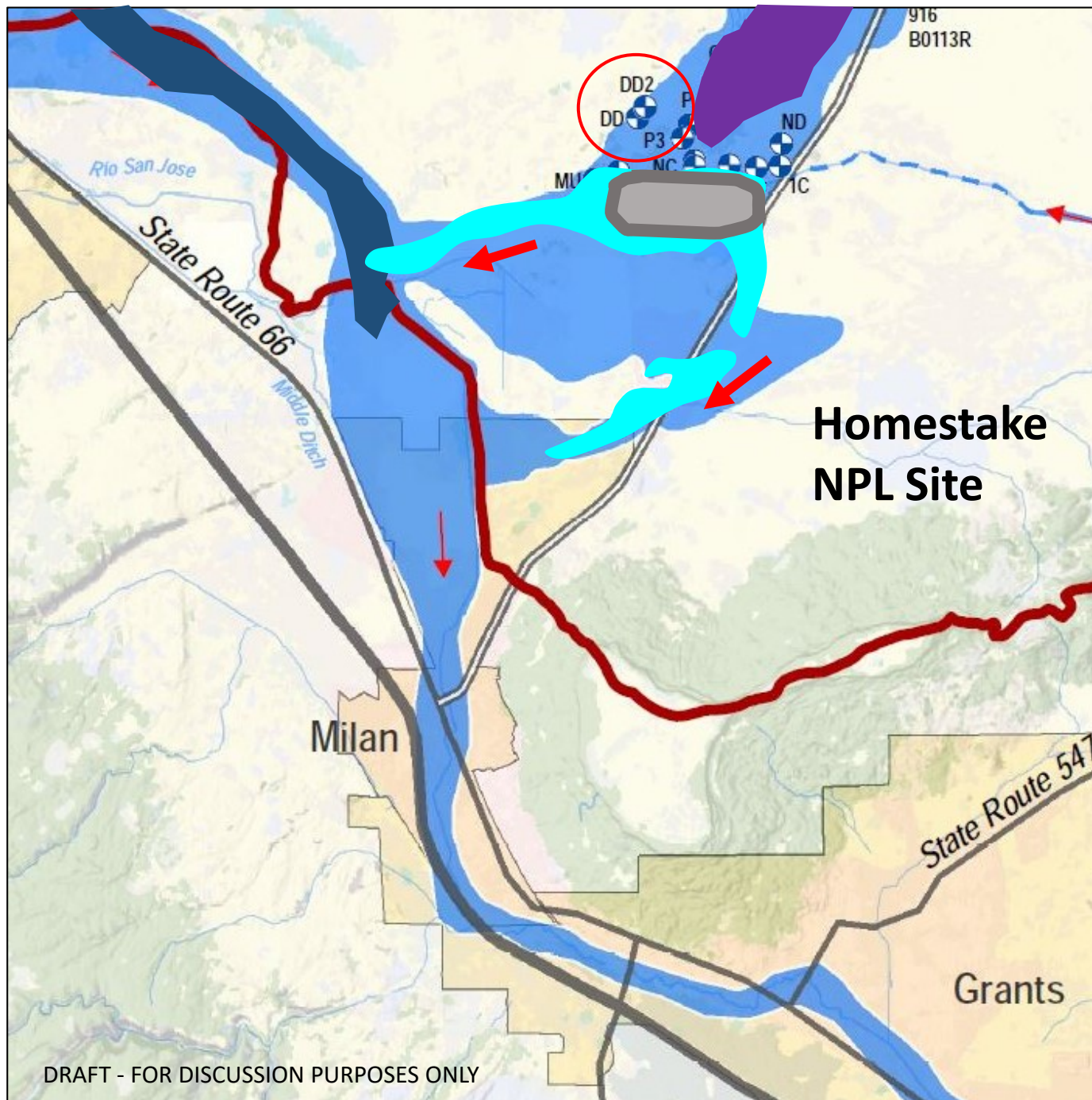
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# Mine Discharge Water Impacts







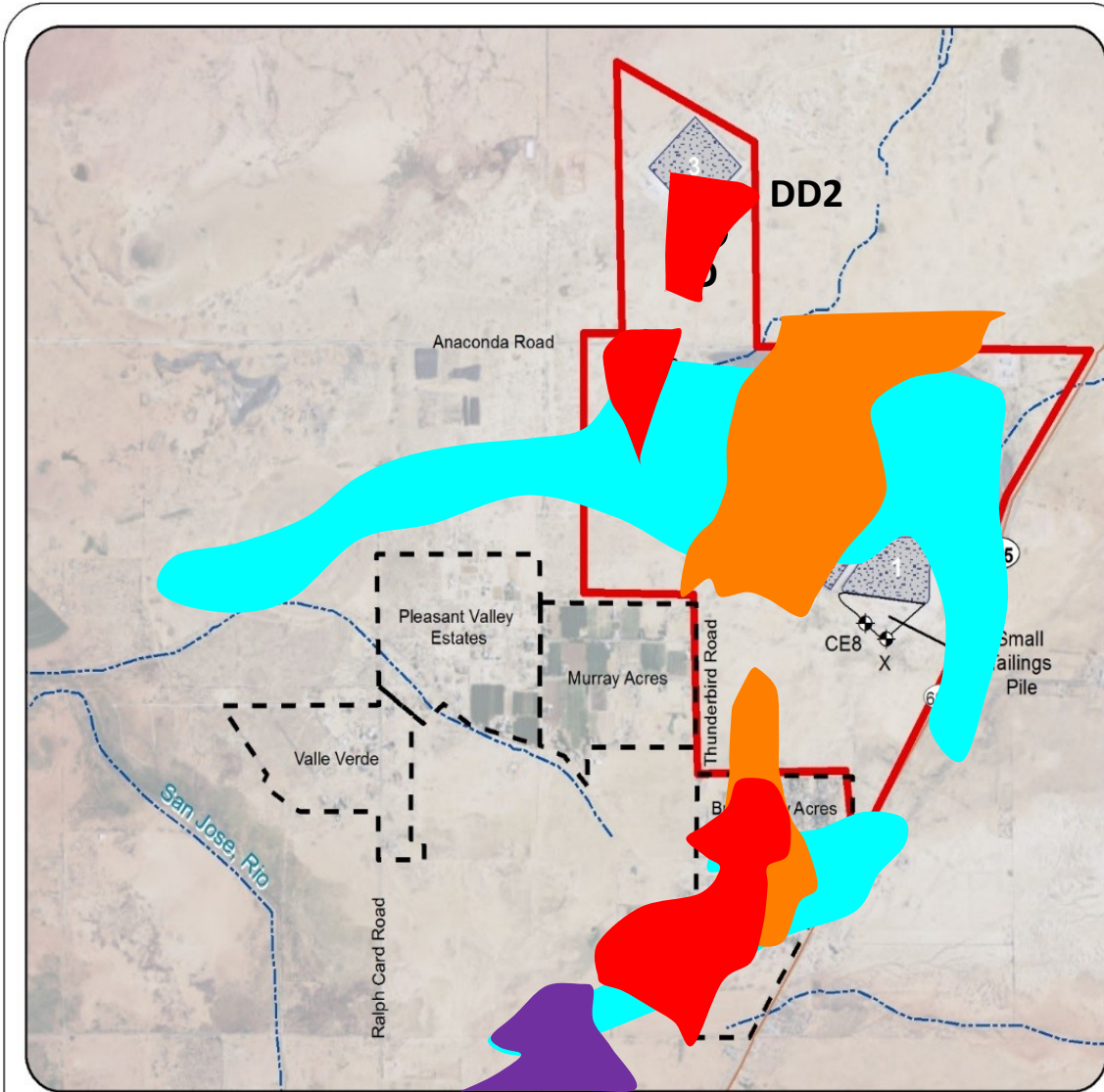
# HISTORICALLY HIGH URANIUM LEVELS IN UPGRADIENT BACKGROUND WELLS

**160** micrograms/liter

Established Uranium  
Cleanup Level - 2006

**30** micrograms/liter  
Federal Drinking Water  
Standard

# SITE MAP SHOWING EXTENT OF GROUND WATER CONTAMINATION



## LEGEND

 Alluvium Impact

### Bedrock Aquifers

 Upper Chinle Sandstone Impact

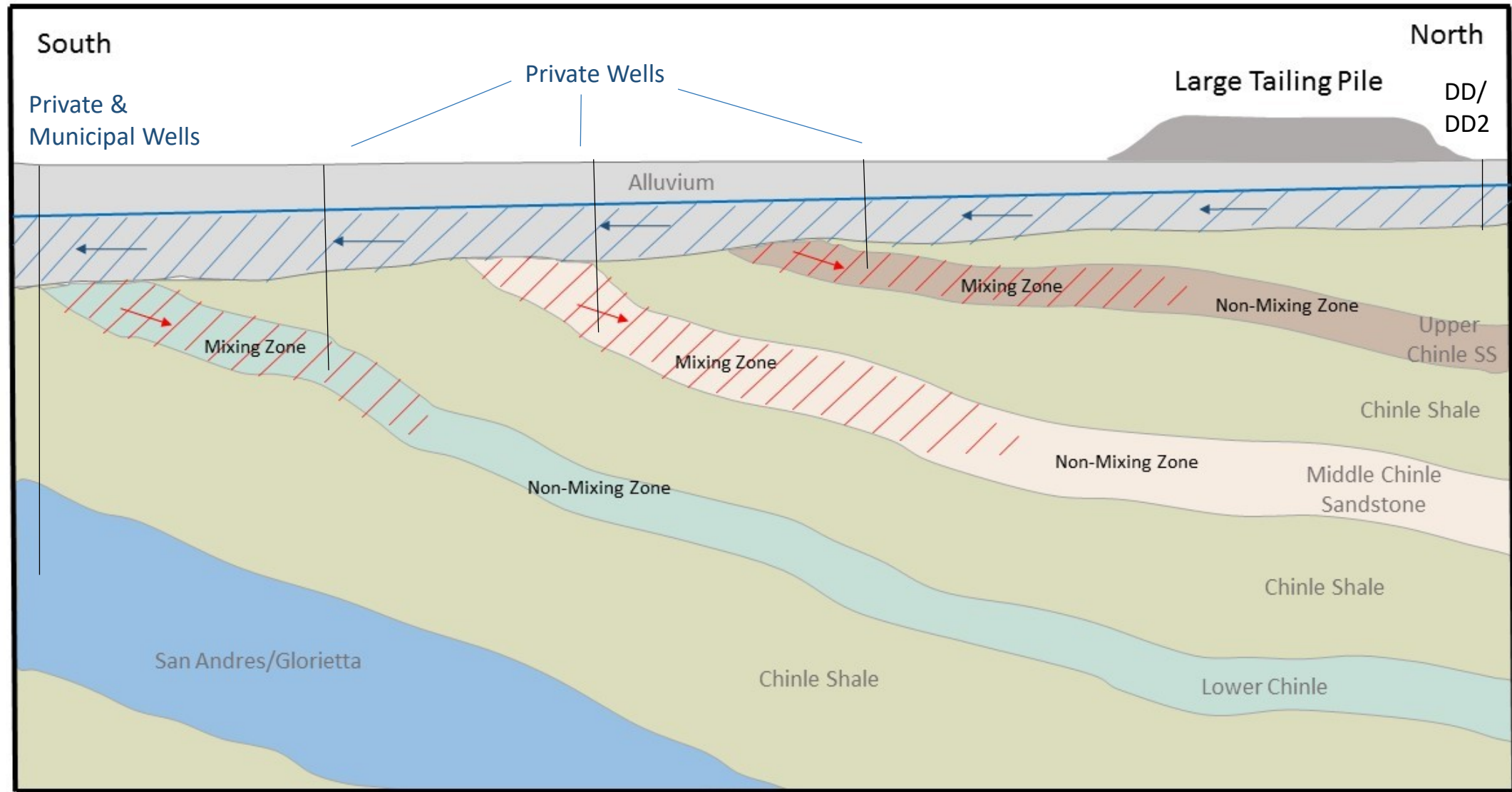
 Middle Chinle Sandstone Impact

 Lower Chinle Sandstone Impact

★ *All impacted aquifers are used for  
drinking water supply at private  
wells!*



# GEOLOGIC CROSS SECTION



# GROUND WATER REMEDY

- Flushing of tailing pile (discontinued)
- Extraction and injection of water
  - Hydraulic Containment
  - Restore aquifers to cleanup levels
- Treatment of water
  - Reverse Osmosis
  - Zeolite filtration beds
- Evaporation of contaminated water
- Land application of contaminated water (discontinued)



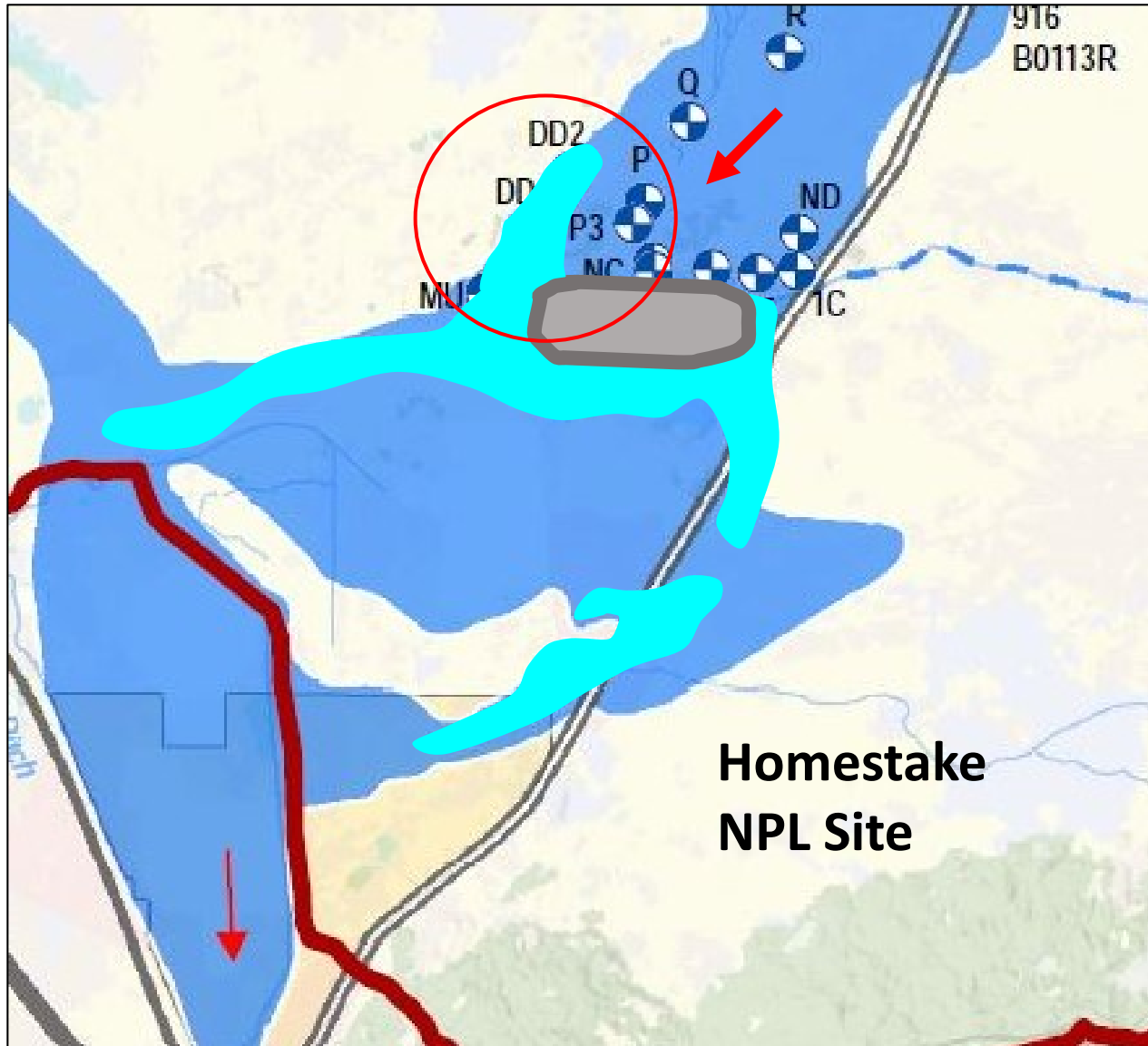
Zeolite Filtration System



R.O. Water Treatment Plant



# BVDA CHALLENGES HOMESTAKE BACKGROUND LEVELS






- BVDA Consultant (Dr. Tom Meyer) proposes alternative model for background in 2015
- BVDA requests EPA hire third party to review Meyer's report
- EPA engages US Geological Survey
- USGS reviews work, proposes additional study to resolve issues

# USGS BACKGROUND STUDY

- Objective – to determine source of high uranium upgradient
  - Natural vs Mine Water vs Homestake
- Study initiated in 2016
  - EPA engaged BVDA to provide comments on USGS study ★
- USGS preparing papers for journal publication in 2018
  - USGS provided multiple updates to BVDA/Consultant
  - USGS policy does not allow for release of draft papers
- BVDA concerned USGS findings will not support Consultant's model

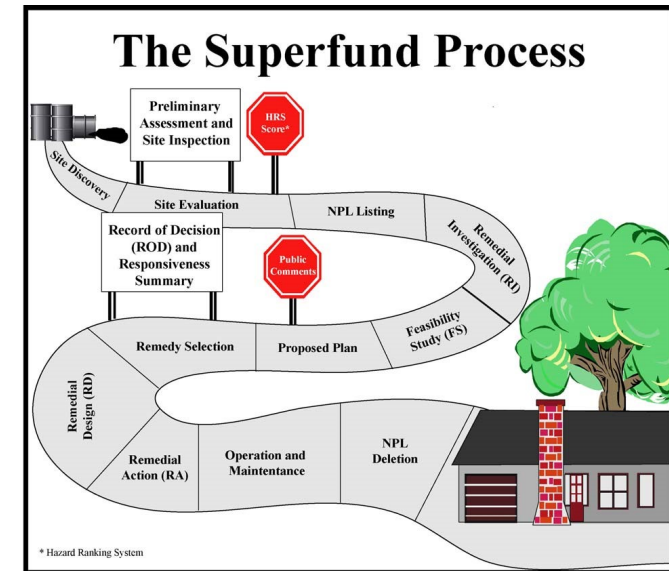


# NEXT STEPS IN REASSESSMENT OF GROUND WATER CLEANUP LEVELS

- EPA will seek community input on USGS published papers 
  - And all other stakeholders
- Assess need to revise GW cleanup levels
  - USGS Papers
  - Stakeholder Comments on USGS Papers
  - EPA San Mateo Creek Basin Ground Water Study 
- Coordinate with NRC and State
  - Accept current background levels or require recalculation for all aquifers
  - Seek input on decision from all stakeholders 
- Direct Homestake to recalculate background, if appropriate
  - Likely to extend timeframe for completing ground water cleanup

# RI/FS EQUIVALENCY PROCESS ONGOING

- EPA determines CERCLA quality cleanup needed to justify site delisting
  - RI/FS Equivalency and Record of Decision required
- Homestake is currently evaluating GW corrective action for RI/FS Equivalency
  - Submitted draft RI Equivalency Report in 2014
- Further progress on draft RI Report is pending decision on background

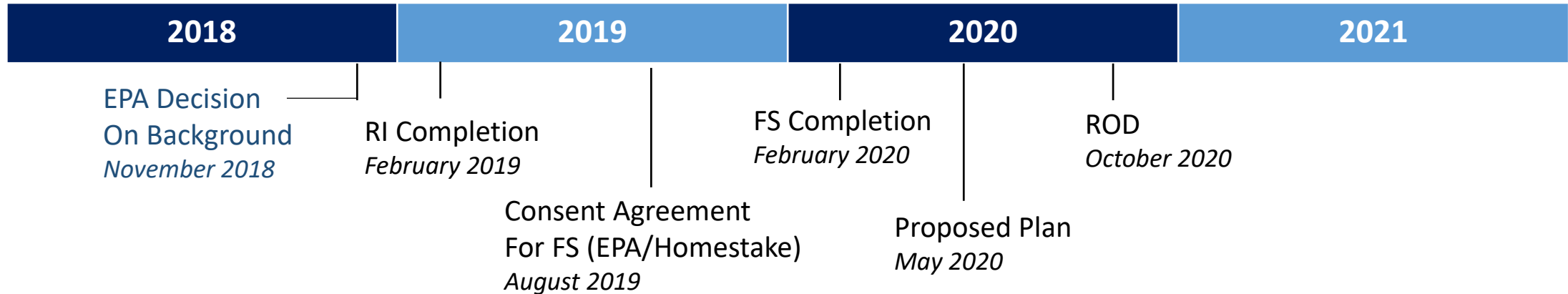




# PATH FORWARD SCHEDULE

## PATH 1

### EPA Approves Current Background



## PATH 2

### EPA Requires Revision to Background

